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10/763,683	01/23/2004	Naotaka Koide	5000-5139	9132

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EXAMINER	
AMADIZ, RODNEY	
ART UNIT	**PAPER NUMBER**
2629	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/16/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/763,683	Applicant(s) KOIDE ET AL.	
	Examiner Rodney Amadiz	Art Unit 2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 23 January 2004.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-20 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-20 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 23 January 2004 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 1/23/04 & 12/5/05.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 11-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over So et al. (U.S. Patent 5,773,130—herein referred to as "So") in view of Nakamura et al. (U.S. Patent 6,992,663—herein referred to as "Nakamura") and Applicant's Admitted Prior Art (Specification Pgs. 1-3—herein referred to as AAPA).

As to **Claim 11**, So teaches an organic electroluminescent device, comprising: an organic electroluminescent element ***(Fig. 1, Reference Number 10)***, wherein the organic electroluminescent element has a pair of electrodes ***(Fig. 1, Reference Numbers 12 and 16)*** and an electroluminescent layer provided between the electrodes ***(Fig. 1, Note the combination of 14 and 15 constitute one EL layer)***, wherein the electroluminescent layer contains at least two types of fluorescent materials ***(Col. 1, line 63—Col. 2, line 21)***, and wherein each fluorescent material emits light the color of which is different from the color of light emitted by the other fluorescent material ***(Col. 1, line 63—Col. 2, line 21)***; and a drive unit that is electrically connected to the organic

electroluminescent element ***(Fig. 1, Reference Number 17)***. So, however, fails to teach the drive unit supplying the organic electroluminescent element a current pulse that has a modulated pulse width, a constant amplitude, and a current density equal to or more than 1 A/cm^2, thereby causing the organic electroluminescent element to emit light. Examiner cites Nakamura to teach an organic electroluminescent element driven by a current pulse that has a modulated pulse width and constant amplitude thereby causing the organic electroluminescent element to emit light ***(Nakamura—Note all of Fig. 6 and Col. 9, line 43—Col. 10, line 2)***. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to drive an organic electroluminescent device by pulse width modulation having constant current as taught by Nakamura in the organic EL device taught by So in order to effectively achieve gray-scale. Moreover, So, as modified by Nakamura, fails to teach the organic EL device having a current density equal to or more than 1 A/cm^2. Examiner cites AAPA to teach that it is well known for organic EL devices to use a current density equal to or more than 1 A/cm^2 ***(AAPA—Pg. 2, line 21—Pg. 3, line 20)***. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to drive an organic EL device with a current density equal to or more than 1 A/cm^2 as taught by AAPA in the organic EL device taught by So and Nakamura in order to provide sufficient brightness ***(AAPA—Pg. 3, lines 12-16)***.

As to <u>Claim 12</u>, Nakamura teaches the drive unit controlling the gradation of brightness of the organic electroluminescent element by a time gradation method ***(Note that PWM is a time gradation method, see also Col. 3, lines 9-57 and Col. 9, line***

43—Col. 10, line 2).

As to **Claim 13**, Nakamura teaches the drive unit controlling the gradation of brightness of the organic electroluminescent element by a time gradation method and an area gradation method ***(Note that PWM is a time gradation method—see also Col. 3, lines 9-57 and Col. 9, line 43—Col. 10, line 2; for area gradation see Col. 2, line 46—Col. 3, line 8)***. Nakamura; however, does not expressly teach using both methods together. Moreover, the specification shows no apparent benefits for using both methods together. Therefore, using both methods together is clearly design choice based on the specific requirement of the claim. Furthermore, it would have been an obvious to one of ordinary skill in the art to use any two gradation methods together, including that of area gradation and time gradation in the organic EL device taught by So, Nakamura and AAPA so as to provide a finer grain grayscale.

As to **Claim 14**, most of the claim limitations have already been addressed with respect to claim 11, with the exception of the drive unit controlling the gradation of brightness of the organic electroluminescent element by an area gradation method. So, however, fails to teach the drive unit controlling the gradation of brightness of the organic EL element by an area gradation method. Examiner cites Nakamura to teach controlling the gradation of brightness of an organic electroluminescent element by an area gradation method **(Nakamura—*Col. 2, line 46—Col. 3, line 8)***. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to control the gradation of brightness of an organic electroluminescent device by an area

gradation method as taught by Nakamura in the organic EL device taught by So in order to effectively achieve gray-scale.

As to **Claim 15**, Nakamura teaches the current supplied from the drive unit to the organic electroluminescent element having a constant current density ***(Col. 10, lines 8-15)***.

As to **Claim 16**, So teaches an organic electroluminescent device, comprising: an organic electroluminescent element ***(Fig. 1, Reference Number 10***, wherein the organic electroluminescent element has a pair of electrodes ***(Fig. 1, Reference Numbers 12 and 16)*** and at least two electroluminescent layers provided between the electrodes ***(Fig. 1, Reference Numbers 14 and 15)***, wherein each electroluminescent layer contains a fluorescent material ***(Col. 1, line 63—Col. 2, line 21)***, and wherein the fluorescent material contained in each electroluminescent layer emits light the color of which is different from the color of light emitted by the fluorescent material of the other electroluminescent layer ***(Col. 1, line 63—Col. 2, line 21)***; and a drive unit that is electrically connected to the organic electroluminescent element ***(Fig. 1, Reference Number 17)***. So, however, fails to teach the drive unit supplying the organic electroluminescent element a current pulse that has a modulated pulse width, a constant amplitude, and a current density equal to or more than 1 A/cm^2, thereby causing the organic electroluminescent element to emit light. Examiner cites Nakamura to teach an organic electroluminescent element driven by a current pulse that has a modulated pulse width and constant amplitude thereby causing the organic electroluminescent element to emit light ***(Nakamura—Note all of Fig. 6 and Col. 9,***

line 43—Col. 10, line 2). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to drive an organic electroluminescent device by pulse width modulation having constant current as taught by Nakamura in the organic EL device taught by So in order to effectively achieve gray-scale. Moreover, So, as modified by Nakamura, fails to teach the organic EL device having a current density equal to or more than 1 A/cm^2. Examiner cites AAPA to teach that it is well known for organic EL devices to use a current density equal to or more than 1 A/cm^2 ***(AAPA—Pg. 2, line 21—Pg. 3, line 20)***. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to drive an organic EL device with a current density equal to or more than 1 A/cm^2 as taught by AAPA in the organic EL device taught by So and Nakamura in order to provide sufficient brightness ***(AAPA—Pg. 3, lines 12-16)***.

As to **Claim 17**, Nakamura teaches the drive unit controlling the gradation of brightness of the organic electroluminescent element by a time gradation method ***(Note that PWM is a time gradation method, see also Col. 3, lines 9-57 and Col. 9, line 43—Col. 10, line 2)***.

As to **Claim 18**, Nakamura teaches the drive unit controlling the gradation of brightness of the organic electroluminescent element by a time gradation method and an area gradation method ***(Note that PWM is a time gradation method—see also Col. 3, lines 9-57 and Col. 9, line 43—Col. 10, line 2; for area gradation see Col. 2, line 46—Col. 3, line 8)***. Nakamura; however, does not expressly teach using both methods together. Moreover, the specification shows no apparent benefits for using

both methods together. Therefore, using both methods together is clearly design choice based on the specific requirement of the claim. Furthermore, it would have been an obvious to one of ordinary skill in the art to use any two gradation methods together, including that of area gradation and time gradation in the organic EL device taught by So, Nakamura and AAPA so as to provide a finer grain grayscale.

As to **Claim 19**, most of the claim limitations have already been addressed with respect to claim 6, with the exception of the drive unit controlling the gradation of brightness of the organic electroluminescent element by an area gradation method. So, however, fails to teach the drive unit controlling the gradation of brightness of the organic EL element by an area gradation method. Examiner cites Nakamura to teach controlling the gradation of brightness of an organic electroluminescent element by an area gradation method **(Nakamura—*Col. 2, line 46—Col. 3, line 8*)**. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to control the gradation of brightness of an organic electroluminescent device by an area gradation method as taught by Nakamura in the organic EL device taught by So in order to effectively achieve gray-scale.

As to **Claim 20**, Nakamura teaches the current supplied from the drive unit to the organic electroluminescent element having a constant current density ***(Col. 10, lines 8-15)***.

4. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over So in view of Nakamura and Hoag et al. (U.S. Patent 6,824,893—herein referred to as "Hoag").

As to **Claim 1**, So teaches an organic electroluminescent device, comprising: an organic electroluminescent element ***(Fig. 1, Reference Number 10)***, wherein the organic electroluminescent element has a pair of electrodes ***(Fig. 1, Reference Numbers 12 and 16)*** and an electroluminescent layer provided between the electrodes ***(Fig. 1, Note the combination of 14 and 15 constitute one EL layer)***, wherein the electroluminescent layer contains at least two types of materials ***(Col. 1, line 63—Col. 2, line 21)***, and wherein each ~~phosphore~~scent material emits light the color of which is different from the color of light emitted by the other ~~phosphoresce~~nt material ***(Col. 1, line 63—Col. 2, line 21)***; and a drive unit that is electrically connected to the organic electroluminescent element ***(Fig. 1, Reference Number 17)***. So, however, fails to teach the drive unit supplying the organic electroluminescent element a current that has a modulated pulse width and a constant amplitude, thereby causing the organic electroluminescent element to emit light. Examiner cites Nakamura to teach an organic electroluminescent element driven by a current pulse that has a modulated pulse width and constant amplitude thereby causing the organic electroluminescent element to emit light ***(Nakamura—Note all of Fig. 6 and Col. 9, line 43—Col. 10, line 2)***. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to drive an organic electroluminescent device by pulse width modulation having

constant current as taught by Nakamura in the organic EL device taught by So in order to effectively achieve gray-scale.

So, teaches the EL layer to contain two types of fluorescent materials. However, So, as modified by Nakamura, fails to teach the EL layer containing two types of phosphorescent materials. Examiner cites Hoag to teach that it is well known in the art to interchange phosphorescent materials and fluorescent materials ***(Hoag—Col. 13, lines 9-27)***. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to replace the fluorescent material as taught by So, as modified by, Nakamura with the phosphorescent material taught by Hoag so that the element may produce light for an extended amount of time after its excitation.

As to **Claim 2**, Nakamura teaches the drive unit controlling the gradation of brightness of the organic electroluminescent element by a time gradation method ***(Note that PWM is a time gradation method, see also Col. 3, lines 9-57 and Col. 9, line 43—Col. 10, line 2)***.

As to **Claim 3**, Nakamura teaches the drive unit controlling the gradation of brightness of the organic electroluminescent element by a time gradation method and an area gradation method ***(Note that PWM is a time gradation method—see also Col. 3, lines 9-57 and Col. 9, line 43—Col. 10, line 2; for area gradation see Col. 2, line 46—Col. 3, line 8)***. Nakamura; however, does not expressly teach using both methods together. Moreover, the specification shows no apparent benefits for using both methods together. Therefore, using both methods together is clearly design choice based on the specific requirement of the claim. Furthermore, it would have been an

obvious to one of ordinary skill in the art to use any two gradation methods together, including that of area gradation and time gradation in the organic EL device taught by So, Nakamura and AAPA so as to provide a finer grain grayscale.

As to **Claim 4**, most of the claim limitations have already been addressed with respect to claim 1, with the exception of the drive unit controlling the gradation of brightness of the organic electroluminescent element by an area gradation method. So, however, fails to teach the drive unit controlling the gradation of brightness of the organic EL element by an area gradation method. Examiner cites Nakamura to teach controlling the gradation of brightness of an organic electroluminescent element by an area gradation method **(Nakamura—*Col. 2, line 46—Col. 3, line 8*)**. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to control the gradation of brightness of an organic electroluminescent device by an area gradation method as taught by Nakamura in the organic EL device taught by So in order to effectively achieve gray-scale.

As to **Claim 5**, Nakamura teaches the current supplied from the drive unit to the organic electroluminescent element having a constant current density ***(Col. 10, lines 8-15)***.

As to **Claim 6**, So teaches An organic electroluminescent device, comprising: an organic electroluminescent element ***(Fig. 1, Reference Number 10)***, wherein the organic electroluminescent element has a pair of electrodes ***(Fig. 1, Reference Numbers 12 and 16)*** and at least two electroluminescent layers provided between the electrodes ***(Fig. 1, Reference Numbers 14 and 15)***, wherein each electroluminescent

layer contains a fluorescent material ***(Col. 1, line 63—Col. 2, line 21)***, and wherein the fluorescent material contained in each electroluminescent layer emits light the color of which is different from the color of light emitted by the flu ~~phosph~~orescent material of the other electroluminescent layer ***(Col. 1, line 63—Col. 2, line 21)***; and a drive unit that is electrically connected to the organic electroluminescent element ***(Fig. 1, Reference Number 17)***. So, however, fails to teach the drive unit supplying the organic electroluminescent element a current that has a modulated pulse width and a constant amplitude, thereby causing the organic electroluminescent element to emit light. Examiner cites Nakamura to teach an organic electroluminescent element driven by a current pulse that has a modulated pulse width and constant amplitude thereby causing the organic electroluminescent element to emit light ***(Nakamura—Note all of Fig. 6 and Col. 9, line 43—Col. 10, line 2)***. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to drive an organic electroluminescent device by pulse width modulation having constant current as taught by Nakamura in the organic EL device taught by So in order to effectively achieve gray-scale.

So, teaches the EL layer to contain two types of fluorescent materials. However, So, as modified by Nakamura, fails to teach the EL layer containing two types of phosphorescent materials. Examiner cites Hoag to teach that it is well known in the art to interchange phosphorescent materials and fluorescent materials ***(Hoag—Col. 13, lines 9-27)***. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to replace the fluorescent material as taught by So, as

modified by, Nakamura with the phosphorescent material taught by Hoag so that the element may produce light for an extended amount of time after its excitation.

As to **Claim 7**, Nakamura teaches the drive unit controlling the gradation of brightness of the organic electroluminescent element by a time gradation method ***(Note that PWM is a time gradation method, see also Col. 3, lines 9-57 and Col. 9, line 43—Col. 10, line 2)***.

As to **Claim 8**, Nakamura teaches the drive unit controlling the gradation of brightness of the organic electroluminescent element by a time gradation method and an area gradation method ***(Note that PWM is a time gradation method—see also Col. 3, lines 9-57 and Col. 9, line 43—Col. 10, line 2; for area gradation see Col. 2, line 46—Col. 3, line 8)***. Nakamura; however, does not expressly teach using both methods together. Moreover, the specification shows no apparent benefits for using both methods together. Therefore, using both methods together is clearly design choice based on the specific requirement of the claim. Furthermore, it would have been an obvious to one of ordinary skill in the art to use any two gradation methods together, including that of area gradation and time gradation in the organic EL device taught by So, Nakamura and AAPA so as to provide a finer grain grayscale.

As to **Claim 9**, most of the claim limitations have already been addressed with respect to claim 6, with the exception of the drive unit controlling the gradation of brightness of the organic electroluminescent element by an area gradation method. So, however, fails to teach the drive unit controlling the gradation of brightness of the organic EL element by an area gradation method. Examiner cites Nakamura to teach

controlling the gradation of brightness of an organic electroluminescent element by an area gradation method **(Nakamura—*Col. 2, line 46—Col. 3, line 8*)**. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to control the gradation of brightness of an organic electroluminescent device by an area gradation method as taught by Nakamura in the organic EL device taught by So in order to effectively achieve gray-scale.

As to **Claim 10**, Nakamura teaches the current supplied from the drive unit to the organic electroluminescent element having a constant current density ***(Col. 10, lines 8-15)***.

Inquiries

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney Amadiz whose telephone number is (571) 272-7762. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sumati Lefkowitz can be reached on (571) 272-3638. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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